BIBLICAL CREATION

JOURNAL OF THE BIBLICAL CREATION SOCIETY

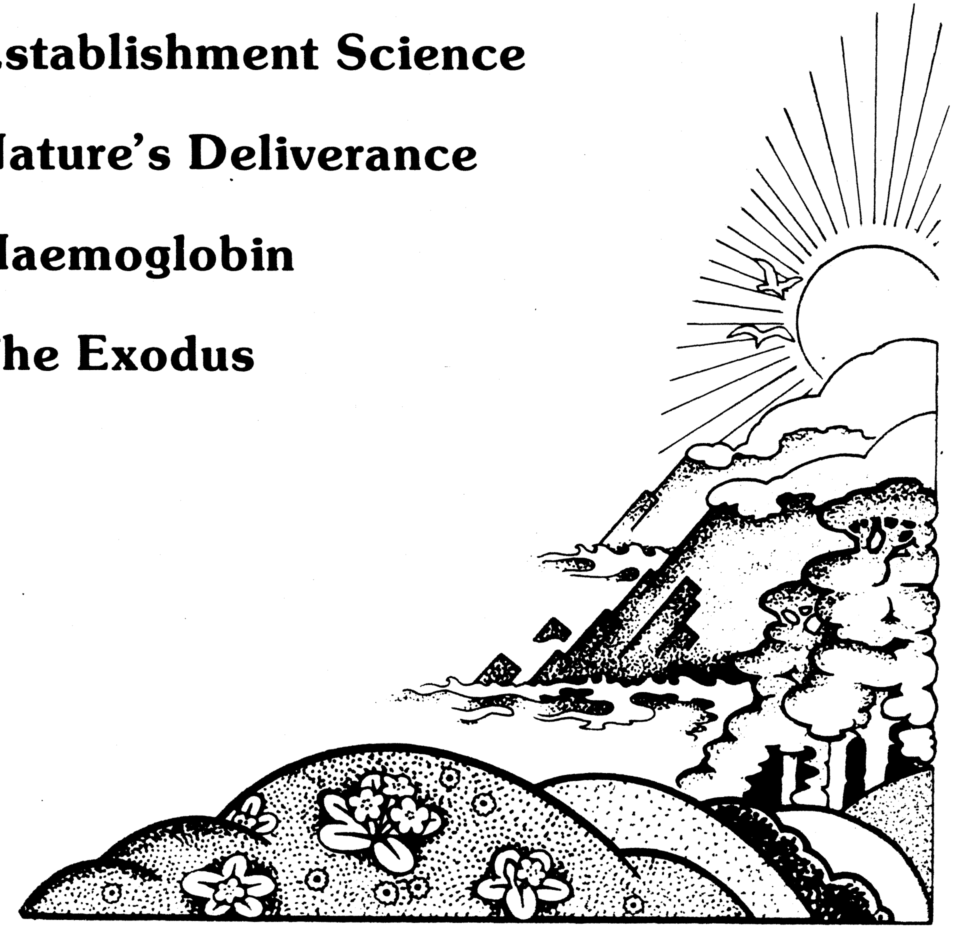
3:10

Establishment Science

Nature's Deliverance

Haemoglobin

The Exodus



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Journal of the Biblical Creation Society

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EDITORIAL

To the other side of the fence

The majority of this Journal's leaders will be both Christians and creationists. Yet we are not merely concerned with addressing the 'converted'. Firstly we wish to persuade other Christians to consider our approach to Origins. But now for once we address the wider circle of men and women presently outside the Christian community. How do you evaluate our Christian belief in the all-powerful, all-wise personal Creator? And what do you make of those who hold this position? We readily admit that sometimes we are poor representatives for the one we profess to serve. At times, for example, we may be too concerned with scoring points in debate. But we sincerely desire that our contemporaries should radically change their outlook and become reconciled to our common Maker through a relationship of trust in Jesus Christ.

At first sight the scientific attitude and training we share in Westernised society may seem to offer sufficient common ground between us. Indeed for our part we want to continue in serious and patient evaluation of the findings of modern research. We can therefore discuss together the many facts relating to origins. But when considering their larger significance our differing world-views may lead to divergence of opinion. And we do not deny that the basis for *our* world-view is the data of the Christian Bible.

To the secular mind it seems anomalous that one book should play so decisive a role in the thinking of educated people. But this book stands apart from every other book. And is there an alternative basis for lasting purpose and hope, in life and death? Surely there is none. We urge you therefore to study the massive movement of biblical thought from *Genesis* to Revelation. It may please the supreme Author to disclose himself to you. He alone can reveal himself and dispel the dark clouds of disbelief. Patiently read and assimilate the Bible's historical message about man's creation and rebellion and God's gracious purposes of restoration through Christ. You may find yourself moving further and further away from a conventional humanistic closed-universe world-view. The Bible's message may not be clear at every point. But it is clear enough. Through its pages, God addresses our proud self-sufficiency and God-less philosophies with the ultimatum: "Surrender or perish"! It is not so much, then, that *we* interpret the Bible. The Bible interprets *us* and our human culture—our oddly blind mind-set which presupposes that God's voice is muffled or absent.

We desire that you will become convinced of the truth of Christianity; for the entire course of history, the development and function of science and culture and the significance of our individual lives are unintelligible apart from the message of this Book.

David Watts

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INSTRUCTIONS TO AUTHORS:

Material for publication in this Journal, whether articles, book reviews, letters or news items should be submitted to the General Editor in the following format. Contributions should be *typed in double spacing on one side only of (preferably A4) paper.* While articles may be subject to review by referees prior to publication, the authors remain responsible for the views expressed.

SOCIETY NEWS

Appointment of Education Officer

Mrs. Ann Kirkwood, B.Ed. has recently been appointed as Education Officer for the Society in a part-time capacity. Initially she will be responsible for co-ordinating the production of a series of tape-slide programmes relating to Origins, for use in schools and other teaching situations.

Publications

At a recent meeting of the BCS committee, it was decided to produce a greatly extended range of short pamphlets in the *'Thinking again . . .'* series. These will be designed to provide straightforward discussion of many topics relating to origins, such as *Stone-Age Men* and *The Age of the Earth* etc. It is hoped that some of these will be available before the end of the year.

Another new venture is the production of a popular style 'mini-magazine' entitled *Rainbow*. This is to be co-ordinated by Mrs. Sylvia Baker. Initially this will be a brochure issued several times per year. The contents will include news items, short articles etc. Technicalities will be avoided and it is hoped that this will find a wide readership and serve to introduce people to the other publications and activities of the Society.

The first in a series of *Technical Monographs* is currently being produced. This is entitled, *The Species Problem: An enquiry into the limits of variation*, by Edward Brearley, M.Sc., M.I. Biol. When available it will be priced £1.00.

BCS Earth Sciences Group

The group has been active during the past year with a field trip organised by David Tyler and the exchange of news and technical discussion in this area.

GENERAL NEWS

In Glasgow University, *Origins*, a discussion group on creation and evolution new meets regularly during term time. University staff, students and any others who are interested, whether in the University or not, should contact Dr. Chris Darnbrough (041-772 2394) for details.

Professor Sir Fred Hoyle and Professor Chandra Wickramasinghe have recently produced a further interesting volume: *Evolution from Space* (Dent). As reported in the press in August, they have now rejected the concept of a random chance basis for the origin of life. They conclude that life on earth is the consequence of intelligent purpose. However, at present they seem to be thinking in terms of a pantheistic framework. Nevertheless Hoyle's outlook has changed significantly from his militantly atheistic attitude in the 1960's.

In May 1980, Professor Henry Lipson, C.B.E., F.R.S., of the University of Manchester published an article in *Physics Bulletin* entitled: *A Physicist Looks at Evolution*. This sparked off a good deal of correspondence among the British Physics community. The article is now accessible to readers of the Creation Research Society Quarterly. It is reprinted in the latest issue vol. *18*, June 1981, p. 14-15.

Professor Henry Morris has been a recent visitor to this country to address the School of Theology at the Metropolitan Tabernacle, London, on several topics relating to the creation debate.

CORRESPONDENCE

Dear Sir,

I am writing in response to the two letters, one by Mr. Limb and the other by Mr. Bell, which appeared in B.C. 3:9 as a result of what I had written in B.C. 3:8 on the need for parent-controlled Christian Schools. As the second of these correspondents questions the appropriateness of the editor's decision to allow this subject to be raised in Biblical Creation, I shall confine myself to clarifying one or two points in connection with Mr. Limb's letter and redirecting discussion with Mr. Bell away from the pages of Biblical Creation.

First of all, regarding Mr. Limb's letter, I should say at the outset that to believe conscienciously that the teaching of the Word of God implies that Christian parents should provide a distinctly Christian education for their children is not necessarily to deny that Christian parents who have come to different conclusions are either responsible or godly. It simply means we have come to different conclusions about the Biblical teaching relative to the education of our children. Also, if one believes some thing to be required by the Word of God, it is not necessarily uncharitable or inconsistant with respect for other Christians to say so, and it would be cause for regret if any expressions used in the article itself in any way gave the appearance of such disregard for others of different viewpoint.

I should like to emphasise that the article was in no way intended to encourage anyone to send his child away from home to be educated, and I would share Mr. Limb's insistance on the primacy of the home for the upbringing of the child, and for that very reason, unless the child's education is to take place entirely in the home (and in that way a Christian education provided according to the Word of God), then so far as the education of the child is put into the hands of others by the parents, it is their responsibility to delegate their authority only to those who will uphold the same standards of truth, conduct and discipline as they themselves would uphold at home.

I should also like to stress that I am not unaware of the enormous demands that the acceptance of the principles set out in the article would make on many, if not most, Christian parents, especially those in the kind of position in which Mr. Limb finds himself. But, however much one may sympathise and seek to understand the difficulties involved, I am not at liberty to reduce in any way the demands of the Word of God.

Moving on to the effect of setting up Christian schools on the state system, such effects however significant cannot be made the ground for not giving our children a Christian education as required by the Word of God. I certainly do not wish to discourage Christian teachers seeking to influence state schools for good. It is true that, initially, the setting up of Christian schools would require a reduction of the number of Christian teachers in the state system, but the very existance of these schools would be a testimony to the unbelieving world that we are prepared to work and sacrifice in order to ensure that our children are brought up in accordance with the truth of the Word of God which we hold dear. In short, it would show we meant business and the Christian school itself would be a witness to the truth.

I think the points raised in the second last paragraph of Mr. Limb's letter were really covered in the article itself. Suffice it to say here that our assessment of the influence of non-Christian teachers is ultimately not relevant. The fact of what God can do in preserving our children despite their being exposed to ungodly instruction is not the rule of our duty but rather the commands of God. It only needs to be added that the imperfections of Christian teachers cannot be made a basis for putting our children into the hands of non-Christian teachers any more than, for example, the imperfections of all Christian ministers would warrant us attending upon the ministry of an obviously unregenerate man.

Turning to Mr. Bell's letter, unlike Mr. Limb, he tells us that the point of his writing was not to state an alternative position to my own, but to question the wisdom of printing the article in B.C. as he regards it as irrelevant to the aim of B.C.S. He did, however, feel the need to state his total rejection of my conclusions, regarding my arguments as extremely dubious and at times a distortion of the scriptural evidence, and the objections dealt with as straw men, and not representative of the main objections against private Christian education.

The objections dealt with may be staw men to Mr. Bell, but I can say quite honestly that they are the arguments that I have heard against Christian schools with great regularity for some years.

I should simply like to offer to Mr. Bell the facility of entering into discussion of the issue in the C.P.T.L. Newsletter since he did not substantiate his remarks in his letter. If he would like to write to me indicating where he regards the article as distorting the Biblical evidence, pointing out the flaws in the argumentation, and bringing forward those arguments against Christian schools which he does not regard as straw men, I would be happy to publish his letter together with either a reply or an amendment of the principles set out in the article as appropriate. Should Mr. Limb care to make further comment, I would be happy to follow the same course with any letter received from him also.

Yours faithfully,

D. Silversides.

FORTHCOMING ARTICLES

Biology Book List by Syliva Baker
Human Life Support Factors in Genesis One by Gerald Duffett
On the Big Bang Theory of Creation by J.B. Griffiths
The Teaching of Evolution and Creation by J.H. John Peet

ESTABLISHMENT SCIENCE AND THE BRITISH MUSEUM

by David J. Tyler

The January 2nd, 1981 issue of *Science* carried an article introduced by these remarkable words:

"Dinosaur battle erupts in British Museum
Anti-cladist sees reds under fossil beds in alliance with creationists to subvert the establishment."

The cleverly constructed subtitle introduces an excellent discussion of the charges laid at the door of the British Museum dinosaur exhibition. The sometimes heated debate has continued for over six months, and certainly contains much of interest to readers of the BCS Journal. This article does not attempt to follow up all the avenues of thought, but it does seek to explain the main issues and to provide some creationist comment.

I. "WHITHER THE NATURAL HISTORY MUSEUM?"

The controversy really started in 1978. In the October 26th issue of *Nature*, Dr. B. Halstead of Reading University expressed concern about the current exhibition policy of the Natural History Museum. Criticisms were not spelled out clearly, but mention was made of "concepts that happen to be current in the present climate of opinion." More pointedly, Halstead expressed the hope that "sufficient pressure can be brought to bear to curb the activities of the Public Services Department and to ensure the survival of the museum's reputation for scholarship in its public galleries."

II. KARL POPPER AND THE METAPHYSICAL NATURE OF EVOLUTIONARY THEORY

Dr. Halstead's next contribution came in the July 17th, 1980 issue of *New Scientist*. His article is concerned with the ideas of Karl Popper, the philosopher of science. Popper's definition of science has important implications for Darwinism, for he has asserted that it is not a scientific theory but a metaphysical theory. Halstead notes that Popper's views have been influential in the British Museum, and that the newer exhibitions are less dogmatic in their presentation of evolutionary ideas. His comment: "It is not difficult to envisage the enormous encouragement the creationists take from assertions from the BM (NH) that the theory of evolution is not scientific." However, Halstead does not attempt to answer Popper, but effectively says that since evolutionary theory is obviously scientific, Popper's position has little to commend it.

Halstead also introduces evolutionary theory and the fossil record as a means of refuting Marxism. He considers that processes of gradual change are inconsistent with the principles of dialectical materialism, which have an important place for abrupt or revolutionary changes. Since Halstead is convinced that the fossil record does not show abrupt changes, he concludes: "The theory of evolution was and still is one of the major factors in dismantling the theoretical basis of Marxism . . ."

Thus, Popper is criticised on two grounds. First, his analysis of evolutionary theory as metaphysical is rejected because Halstead disagrees with his restricted definition of science. Second, and even less well argued, Popper's views undermine a scientific rebuttal of Marxism.

Both of Halstead's criticisms are controversial, and both are taken up by correspondents in the later debate in the pages of *Nature*. In this review of events, discussion will be deferred until later. For the present, Halstead has prepared the ground so that all is ready for his major challenge to the British Museum (Natural History) exhibition policy.

III. "MUSEUM OF ERRORS"

In the 20th November 1980 issue of *Nature*, the correspondence page carried the arresting headline: "Museum of errors." It introduced a letter which has stimulated a lively debate, involving over 30 letters, 3 editorials and several other contributions in the national press and the BBC.

"Two years ago", writes Halstead, "I questioned the wisdom of what is happening at the Natural History Museum in South Kensington . . . Since then, time has passed. It is no longer a question of raising the alarm but simply of reporting what has already happened. Two areas of the museum's work have already succumbed : dinosaurs in 1979 and fossil man in 1980. Both the new exhibits are simply vehicles for the promotion of a system of working out relationships known as cladistics."

Here, in a nutshell, is the substance of the controversy—the Public Services Department of the British Museum has chosen to present its exhibits in the context of cladistics. This was the "present climate of opinion" which Halstead questioned in 1978 and this is what he wanted to see curbed.

Such strong feelings must seem very strange and confusing to those who are unacquainted with cladistics, and a few words of explanation are deemed appropriate at this point.

THEORIES OF BIOLOGICAL CLASSIFICATION

There has always been discussion among biologists about the way living organisms should be classified. There are three systems of importance in taxonomy.

1. ESSENTIALISM. This was the first systematic approach to classification, and it was based on a belief in creation. God has created living things to reproduce after their kind and it follows that a definite number of distinct kinds existed in the world at the beginning. Creationists today hold to this theory of classification.
2. EVOLUTIONARY CLASSIFICATION. According to neodarwinistic theory, living things have a common ancestry. Speciation has occurred because organisms have evolved and diverged with the passage of time. Classification is based on an inferred evolutionary genealogy.
3. CLADISM. Organisms are classified according to observed characteristics and shared features. The aim is to avoid making any assumptions about phylogenetic trees. Cladism has become popular in recent years for a wide range of reasons. Some are explained in this article. (Those who wish to learn more about cladistics should visit the British Museum! The recent exhibitions are excellent guides to its principles and applications.)

Returning to Halstead's cry of alarm, we are entitled to ask why taxonomy is such a hot potato. The question is one which Halstead makes a point of answering. "The questions that should arise in everyone's mind are: what is this all about, what actually is going on and what is behind it all? The answers can be found by reading the literature of cladistics. The tenor of this is seen in its abuse of E. Mayr and G.G. Simpson, and indeed of Charles Darwin himself, because of their firm adherence to the concept of gradualism and to the idea that the processes that can be observed at the present day, when extrapolated into the past, are sufficient to explain changes observed in the fossil record. The synthesis of population genetics and palaeontology presented by Simpson in his two seminal works *Tempo and mode in evolution* (1944) and *The major features of evolution* (1953) is anathema to cladists."

To put it bluntly, cladism is a departure from neodarwinistic ways of thinking, and so it is an attack on the orthodox establishment position. The obvious prominence of cladistic thinking in the British Museum is the major concern of Halstead. He is alarmed because this influential museum is no longer adhering to the 'received wisdom' of the establishment, and it is openly promulgating 'heretical' views to the general public.

This point is made even more forcibly by Halstead in a second letter (1/8 January 1981), when he expanded his criticism with these words: "The death of scholarship in the Natural History Museum is not in my opinion marked by the advocacy of cladistics or even Marxism in the public galleries . . . but rather in the manner of the advocacy." His objection is that cladistics is presented as *the way* to look at relationships between species and his alarm is because treatment of gradual evolutionary change is lacking.

A second digression is justified at this point. It is necessary to enquire why cladism has had such an influence within the British Museum—which has a worldwide reputation as an authority on taxonomy. To pursue this, it is helpful to look at some modern developments in palaeontology.

THE THEORY OF PUNCTUATED EQUILIBRIA

One of the predictions made by Darwin was that the fossil record would reveal transitional forms. This prediction was essential to his theory, for the fossil record known in Darwin's day did not support his ideas about gradual change. If Darwinism was valid, many link fossils would be found as palaeontologists studied more and more of the earth's sedimentary rocks. However, despite the passing of over 100 years, Darwin's prediction is no nearer fulfillment! A few link-fossils are claimed today, but they do not satisfy the requirements of evolutionary theory. Creationists, of course, have pointed out that these observations show Darwinism and Neodarwinism to be based on presupposition and to lack an adequate foundation.

Creationists are not the only people who recognise the significance of the fossil record for evolutionary theory. A number of palaeontologists are resigned to the thought that link-fossils will never be found in any numbers. Closely related to this thinking about the fossil record is a disillusionment with Neodarwinism, because its suggested mechanism of evolution lacks the power to do anything more than produce minor changes in organisms. A realistic mechanism for evolution must be able to generate new genetic information and to provide for radical restructuring of existing genetic information.

Consequently, the theory of punctuated equilibria has been launched. This suggests that evolution takes place rapidly—almost catastrophically. The evolutionary spurts may be separated by very long periods of comparative stability. In these equilibria, or quiet periods, neodarwinistic mechanisms operate to produce minor, gradual changes.

If evolutionary change is rapid, very few transitional forms can be expected to be fossilised. Therefore, this theory predicts a near-absence of link-fossils. It also predicts that the mechanisms of evolutionary change have yet to be discovered. (Hence the recent interest in the work of Gorczynski and Steele, mentioned in BC:8, page 22)

Whilst it is admitted that the connection is not rigorous, cladism is obviously a realistic approach to classification within the framework provided by the theory of punctuated equilibria. If evolution is rapid, tracing evolutionary genealogies must be highly speculative, and it is far more meaningful to talk about relationships without reference to ancestry. This is exactly what cladism attempts to do. In practice, cladism enables taxonomists with widely differing views to communicate effectively, and this has contributed to its popularity.

It must be said that the neodarwinistic establishment men view punctuated equilibria with dismay, and regard cladism as a backward step. Halstead's approach is to charge some of the advocates of the punctuated equilibria theory with being politically motivated. "If it could be established that the pattern of evolution was a saltatory one after all, then at long last the Marxists would indeed be able to claim that the theoretical basis of their approach was supported by scientific evidence. Just as there are "scientific" creationists seeking to falsify the concept of gradual change through time in favour of catastrophism, so too there are the Marxists who for differenct motives are equally concerned to discredit gradualism." In other words, Halstead rejects all non-gradualistic interpretations of the fossil record and suggests that they may be politically or religiously motivated.

Halstead's concern is that the British Museum has become infected by unorthodox ideas which are dangerous to science. Not only do these ideas contain implicit revolutionary overtones, but they also lend support to the arguments of creationists. "What is going on at the Natural History Museum needs to be seen in this overall context. If the cladistic approach becomes established as the received wisdom, then a fundamentally Marxist view of the history of life will have been incorporated into a key element of the educational system of this country. Marxism will be able to call upon the scientific laws of history in its support, with a confidence that it has not previously enjoyed."

IV. COMMENT

Halstead's warning has stimulated a remarkable discussion on all the concepts outlined in this review—and more besides. This debate about the nature of evolutionary theory is far-reaching in its implications. Comment here is confined to three major topics.

IV.1 The relevance of the debate to creationism.

On paper, the controversy is not about the supposed fact of evolution, but about the philosophical status of evolutionary theory and the mechanism of evolutionary change. However, from the quotations already made, it is apparent that creationists cannot be excluded from the debate.

First, creationists have generally approved Popper's assessment of evolutionary theory. Creationists argue that both the Theory of Evolution and the Theory of Creation are metaphysical theories. The fundamentals of both are presupposed and are not capable of scientific proof or disproof. The superstructure erected on these metaphysical foundations can be genuinely scientific. Consequently, creationists claim that their approach is no more metaphysical and no less scientific than the approach of evolutionists.

Second, creationist biologists are keenly interested in proposed mechanisms of evolutionary change. They have consistently pointed out that these mechanisms are inadequate for the task of explaining the origin of species. In this they have now been joined by the advocates of punctuated equilibria. The dilemma for the latter group is that whilst they believe an alternative mechanism must exist, they are hard-pressed to justify their beliefs. It is accepted that debates about the mechanism of evolution are properly classified as scientific debates. Propositions can be tested and evaluated in the laboratory and in the field. Creationists predict that the boundaries of the created kinds are defined and cannot be breached. They claim that all genetic changes will take place within these boundaries, and that all the proposed mechanisms of evolution are means of producing changes within the limits of variability of the created kinds. All the scientific evidence is consistent with the creationist position.

So creationism cannot be kept out of this debate about origins. Evolutionary theory is riddled with doubts and uncertainty. Creation is a realistic and rational explanation of the observed facts.

IV.2 The role of the establishment.

It is essential that scientists are allowed freedom of enquiry and freedom of speech. This means liberty to debate differing interpretations of observed phenomena and to consider the arguments on their merits. Without this freedom, science falls prey to prejudice and bigotry—whether it be political, religious or humanistic. This article cannot develop this thesis in any depth, but it does aim to point out the inhibiting influence which 'establishment science' can have.

How is scientific debate to be conducted? Is it right to call for "sufficient pressure" to be brought to bear on a Department to "curb" its activities? Is this reasoned argument? Is this the sort of 'scholarship' we wish to encourage? The danger of establishment science is that 'received wisdom' becomes blind dogma in those who have received it; and instead of employing 'wisdom' to comment itself, it uses other forms of persuasion.

IV.3 The issue of scientific philosophy.

Halstead's letter makes it clear that his political thinking is linked in some way to his scientific thinking. On a political level, he holds to a "gradualist, reformist" approach, and obviously thinks that there are "scientific laws of history" which support his political views. We are entitled to ask: how far do his political views influence his scientific views? Has Halstead built his scientific views on certain presuppositions about the nature of reality? Are the concepts of gradualism and uniformitarianism deduced using the scientific method or merely assumed?

At this point, discussion of presuppositions and their significance for historical science must be resumed. Popper's analysis of the metaphysical nature of Darwinism goes to the heart of the matter. Darwinism has philosophical roots which are assumed, and not deduced using scientific methodology. It is curious that although Halstead's *New Scientist* article sought to criticise Popper's thinking, his letter in *Nature* serves as an illustration of the validity of Popper's argument!

As has been noted, the significance of Popper is that evolution and creation are on a par when it comes to their status as theories. This is of crucial importance in the USA at present, where the teaching of origins in schools is much debated. The American journal, *Science*, has reported on the issues and one of the letters of response has this significant comment.

> "I give my compliments to William J. Broad for his recent News and Comment article on the evolutionist-creationist confrontation. His is the first article I have seen to point out that the principal issue at stake is not one of facts, but of philosophy." (15 May 1981)

This observation correctly identifies the importance of scientific philosophy in the creation-evolution debate. For this very reason, *Biblical Creation* does publish articles relevant to this issue. It is important that creationists are clear about the nature of their work as students of the past and that they relate this to the scientific enterprise as a whole. The correspondence in *Nature* is a reminder that many scientists are only beginning to think through these issues for themselves. Creationists aim to make positive, constructive contributions to the debate about origins, and this must include discussion of the philosophy of science.

V. SUMMARY

Recent criticisms of the British Museum exhibitions policy reflect the antipathy of the establishment neodarwinistic view to new thinking about evolutionary change. The growing voice of creationsim is also eliciting a response in the thinking of evolutionary scientists. This article has briefly reviewed some of the modern developments in taxonomy and palaeontology, to provide a background for appreciating criticism of the recent exhibitions at the British Museum. Some suggestions have been made to promote constructive involvement by creationists in the creation-evolution debate.

Literature cited

Halstead, L.B. 1978. Whither the Natural History Museum? Nature *275*,
Halstead, L.B. 1980. Popper: good philosophy, bad science? New Scientist *87*, 215-217.
Halstead, L.B. 1980. Letter. Nature *288*, 208.
Halstead, L.B. 1981. Letter. Nature *289*, 106-107.
Tyler, D.J. 1981. The legacy of the Midwife Toad. Biblical Creation 3:8, 21-23.
Wade, N. 1981. Dinosaur battle erupts in British Museum. Science *211*, 35-36.
Way, A.B. 1981. Letter. Science *212*, 737-738.

British museum (Natural History) exhibition guide-books:
    Dinosaurs and their living relatives. 1979.
    Man's place in evolution. 1980.

NATURE'S BONDAGE AND DELIVERANCE

The threefold state of creation in Romans 8: 19-22

David Watts

> [19]*"The creation waits in eager expectation for the sons of God to be revealed.* [20]*For the creation was subjected to frustration, not by its own choice, but by the will of the one who subjected it, in hope*[21] *that the creation itself will be liberated from its bondage to decay and brought into the glorious freedom of the children of God.*[22] *We know that the whole creation has been groaning as in the pains of childbirth right up to the present time."*
>
> (Romans 8: 19-22; NIV)

The Christian view of the natural world[1] is utterly different to that of secular humanism. It is clearly presented in these striking words from Paul's letter to the Romans. Far from being self-existent and basically unchanging nature has been profoundly transformed since its original creation. Man's environment is now involved in his plight and groans for a cosmic deliverance. This is why nature presents a strange blend of beauty and suffering.

Our purpose is to analyse this passage[2] in detail as an integral component of God's authoritative revelation. Then we shall consider implications for the Christian world-view, the interpretation of *Genesis* and the science of origins.

The Old Testament Background

In the study of the New Testament, it is appropriate, and consistent with a high view of Scripture, to ask to what extent a given writer has derived his ideas from earlier sources. Frequently the New Testament letters are re-applying the sayings and teachings of the Old Testament or those of Jesus from the gospel sources.

Within the 20th century a dominant view of the background to *Romans* 8:19ff has been that espoused by Professor R. Bultmann. According to him gnostic mythology lies behind the allusion to the "fall of creation" in this passage.[3] Bultmann's approach derived from a 19th century scientific world-view which no longer knew what to do with biblical references to creation or the future. These were consigned to a dustbin labelled myth. Paul's truncated message was then confined to the horizons of an individualistic 'salvation' reinterpreted existentially as authentic living.[4]

Despite Bultmann's brilliance and erudition this entire approach was ill conceived. Today the gnostic myth interpretation of this passage is repudiated even by his followers in Germany.[5] First of all there is the evidence that developed gnosticism was a post-biblical phenomenon.[6] But more important is the obvious background in the Fall narrative of *Genesis* chapter 3. Adam's fall into sin attracted God's curse upon the earth:

> "Cursed is the ground because of you; through painful toil you will eat of it all the days of your life". (*Genesis* 3: 17)

The Rabbinic and apocalyptic Jewish writers of Paul's day[7] anticipated that the Messiah would bring about deliverance to the world from this creation-wide catastrophe occasioned by the Adamic fall. In this belief they were simply reiterating and developing the Old Testament expectation of the renovation of nature in a new heavens and a new earth[8]. Thus in *Romans* 8: 19ff, Paul expounds this Old Testament hope in the light of the resurrection of Jesus Christ.

Adam in Pauline Theology

In Paul's theology, Adam and the narrative of *Genesis* 1-3 is a pervasive theme.[9] Additional to the four Pauline passages where Adam is mentioned directly, there are also allusions to the creation/fall narrative where his name fails to occur. Especially in *Romans* there are five passages of note, one of which (5: 12-19) contains an explicit reference and the remainder may be judged to involve some allusion to Adam.[10] These are 1: 18-25; 3: 23; 7: 7-11 and our present text 8: 19-22. Paul's understanding of man in terms of creation, fall and redemption is bound up with his understanding of the historical first Adam and the work of Christ as the Last Adam. Consequently the treatment of Creation in *Romans* 8 is part of this larger whole.[11] It should not be regarded as an isolated or incidental theme in Pauline thought.

Context: Life in the Spirit

Proceeding to the immediate context of *Romans* 8, Paul shows that the life promised to the man who is righteous through faith in Christ is a life characterised by the indwelling of the Holy Spirit.[12] The basic statement is made in v 1-11. Paul goes on to say in v 12-16 that to be indwelt by God's Spirit is to be a son of God.[13] Verse 17 makes the transition from the theme of sonship and obedience to that of Christian hope (v 18-30) via the connection between sonship and inheritance.

We are co-heirs with Christ, "if indeed we share in his sufferings in order that we may also share in his glory." This qualification balances the statement which follows in v 18: Present sufferings fade into insignificance when compared with that future glory which is the object of Christian hope. There is some dispute as to precisely how the sub-section referring to creation fits into the overall argument of the chapter. It is frequently asserted[14] that v 19-22 and v 23-27 are intended merely to *confirm* the theme of v 18. However this appears to miss the mark. Firstly Paul speaks of creation for its own sake, to teach Christians the cosmic scope of Christ's redemption.[15] Secondly, he is concerned to maintain a carefully balanced theology of the cross,[16] as in v.17c. This motive lies behind the entirety of v.19-27. Hence those who are already God's sons and who anticipate heavenly glory are also those who share at present in the groaning of every creature (v.22-23). It is through a measure of participation[17] with his sufferings that we are conformed to the image of God's son and brought to glory (v.29f; 35f).

The Scope of Creation

In the interpretation of these verses it is clearly of paramount importance to define the contextual meaning of *he ktisis*, the 'creation'[18] as precisely as possible. In *Romans* 1:20, this word denotes the original creative *act*.[19] Here it must refer to the *product* of that act. The question is: How much of created reality does it include? The expression in v.22: 'the whole creation',[20] is very comprehensive. Thus we should *exclude* whatever range of meaning is disallowed by the context and the analogy of scripture but *include* the totality of the remainder. Down the centuries, several meanings of the term have been postulated.[21] The main issue is whether *ktisis* refers here to the totality of the sub-human creation alone, or additionally to mankind as a whole. The latter suggestion has been passionately advocated in the interests of unqualified redemptive universalism.[22] Support has been sought in the personifying verbs in the context. However, there is ample precedent in the Old Testament for the personification of the sub-human creation.[23]

Christian believers, as the sons of God, are excuded here because they are distinguished from the 'creation' in v.19, 21 and 23. Likewise people who at present are unbelieving but will be converted are excluded because they will finally be among the sons of God. The statement in v.20, 'subjected. . .not by its own choice' excludes a reference to Adam and therefore a general reference to mankind. A reference to non-Christians is disallowed because the 'eager expectation' of v.19 does not characterise them. Satan and demons are excluded for the same reson.[24] Angels are not included because they were not subjected to frustration and the bondage of decay. The meaning of 'creation' in this passage is therefore restricted to the entirety of non-rational nature, animate and inanimate, that is the earth and its creatures subordinate to man.

Creation's Primaeval Fall

The present condition of creation, Paul tells us, is 'neither original nor final'.[25] There are three successive states to be considered, together with intervening transitions.[26] (These are tabulated in figure 1). According to v.19-22, the creation anticipates an eschatological transformaion into a future state of glory.[27] And from v.20f we learn that the creation was brought from its original to its present condition as the result of a deliberate and historical curse.

Paul shared with his Jewish kinsmen the belief that God's work in creation was flawless.[28] God created all things in wisdom, yet now there is something amiss. That is the problem answered by this passage. The lower creation did not choose itself to become subject to frustration (v.20a).[29] Rather that decision was made 'by the will of the one who subjected it'.[30] Who is this subjector? This refers to the agent implied by the passive 'was subjected' (*hupetagē*)[31] earlier in the verse. Someone is required who subjected nature i) actively and authoritatively[32] to bondage, and ii) 'in hope' (v.20).[33] This rules out Adam or man in general. The use of the passive form veils a reference to God. The aorist 'tense' refers here to a particular space-time event, the judicial consequences of the fall. Apart from its own action, God subjected creation to futility along with mankind. In *Romans* 5, Paul emphasised the consequences of Adam's sin for humankind. Now he has underlined the solidarity of nature with the plight of Adam's race. New Testament authority thus undergirds a straight-forward historical interpretation of *Genesis* at this crucial juncture.[34]

Creation's Present Condition

The existing stage of nature is characterised in v.20f by futility and bondage to decay. Firstly, Paul links this 'futility' explicitly with the divine judicial subjection. The consequence is emphasised by the word-order: '*To futility* the

Figure 1
CREATION IN THREE SUCCESSIVE STATES (Romans 8)

	transition from PREVIOUS STATE	PRESENT STATE	eschatological transition	FUTURE STATE
v.19		the creation waits	*eager expectation*	the revelation of God's sons
v.20f	the creation was subjected	futility	*in hope*	
		the creation itself bondage to decay	will be liberated from . .into . .	the freedom of the glory of God's children
v.22		the whole creation groans together even until now	as in birth pangs	

creation was subjected'.[35] Secondly, the causal link between this historical curse and the present 'bondage to decay' is no less apparent. Nature's bondage is the counterpart and effect of God's 'subjecting'.[36] As we proceed to discuss the meaning of these two terms more fully we emphasise again that these characteristics were *absent* from nature as originally created by God. The creation remained in perfect freedom from 'futility' and 'decay' until the time of Adam's transgression.

What factors are involved in 'futility' *mataiotes* and 'decay' (*phthora*)? Although these terms are related here they are not synonymous. *Mataiotēs* is commonly translated as 'emptiness, frustration, futility, purposelessness', etc.[37] The majority of its *Septuagint* occurrences are found in *Ecclesiastes*, where it denotes man's awareness of the vanity of earthly things.[38] The related adverb *maten* means 'in vain, to no end'.[39] Thus Cranfield[40] concludes that the word has the basic sense of 'that which fails to attain its goal'. This purpose nature once had it cannot at present attain.[41] At this juncture, however, we must remember the general Biblical and Pauline teaching on God's providence and 'common grace', lest these negative expressions respecting creation be pressed beyond the analogy of Scripture. The creation has not been abandoned, but even in the present experience of relative futility it remains God's creation, receiving his care and sustaining power.[42]

The expression 'bondage of decay', meaning 'the bondage which consists in decay',[43] carries the thought of 'futility' still further. Nature is not without a destiny in its fallen state. But until the dawning of future deliverance that destiny is *phthora*, which is sharply contrasted with *doxa* (glory)[44] in v.21. The word denotes here dissolution, corruption and decay. Since this is something attributed to the non-rational creation it cannot be personal or ethical in character. It must apply at either the behavioural, biological or physical levels in the animal, plant or inorganic kingdoms[45] (Figure 2). This word *phthora* was used by Paul a few years earlier in his Corinthian correspondence when discussing the resurrection of the dead. It means there that which is perishable in the sense of mortal:[46]

> "So it will be with the resurrection of the dead. The body that is sown is perishable (*phthora*), it is raised imperishable; It is sown in dishonour, it is raised in glory; . . ."
>
> *I Cor.* 15:42f (cf. v.50)

This strongly suggests that at the biological level this 'bondage to decay' involves the ultimate death of living creatures. It would not follow logically from this passage, however, that *every* mode of death is necessarily a consequence of the 'bondage to decay' and hence of the Adamic fall. Conceivably there may be some forms of 'death' in the sub-human kingdoms which occur for reasons other than God's curse. For example, the 'death' of plant cells in the digestive tract of animals or humans (*Genesis* 1:29f). With this general qualification, however, it may be concluded that all modes of death which occur as the outcome of the 'bondage to decay' were totally absent from the world prior to the historical Adamic transgression of *Genesis* 3. These unnatural modes of death (in the sense in which all human death is unnatural) must at least include death in the animal kingdom which is painful and untimely, whether brought about by predation,[47] disease or physical catastrophe.

Figure 2
MODAL ANALYSIS OF CREATURES

MODES	REPRESENTATIVE ACTIVITIES	EXHIBITED BY:
Personal	ruling, speaking buying,	Men
Behavioural	breathing, fearing, eating,	Men, Animals
Biological	living, growing, reproducing,	Men, Animals, Plants
Physical	having mass, shape, colour, energy.	Men, Animals, Plants, Inorganic objects.

The present state of the natural world might well be summarised in the words of *Hosea* 4:1-3, a declaration of the environmental consequences of man's sin:

> "Because of this the land mourns,
> and all who live in it waste away;
> the beasts of the field and the birds of the air
> and the fish of the sea are dying". (v.3)

Implications for Palaeontology

The remains of some creatures which have died in an 'unnatural', painful or untimely manner will then have become fossilised in sedimentary rocks. It follows that *rock strata containing such fossils must have been laid down subsequent to the Fall.* These fossils resulting from the 'bondage to decay' will include all human fossils and probably the great majority of animal fossils. Possibly plant fossils and remains of some lower orders of animal life *may* be excluded. Greater precision respecting these implications for Palaeontology and Historical Geology seems difficult to obtain in the present investigation. However, the conclusions that have been established are sufficient to warrant a substantial revision of the uniformitarian paradigms in these disciplines.

Decay and Entropy?

The expression 'bondage to decay' has been interpreted too widely at times through uncritical exegesis and indiscriminate association of ideas. In particular, the suggestion has been made[48] that the 'bondage to decay' has introduced some effects at the physical level of nature. This is the idea that this decay involves the 'entropy' of physical systems and that possibly entropy is a causative factor in organic death. The implication would be that there was no entropy operating in nature prior to the fall. This is not the occasion to enter upon a full discussion, but a brief explanation and critique of this proposal is in order.

Entropy and energy are two of the main concepts in Thermodynamics, the science of the interrelationships between heat and other forms of energy. The Second Law of Thermodynamics, expressed most straightforwardly, states that the 'entropy of the universe tends to increase to a maximum value'. What is entropy? It is a quantity which is a measure of a particular type of microscopic disorder in solids, liquids and gases. Furthermore, the entropy of a physical system increases as the proportion of energy available to do useful mechanical work decreases.

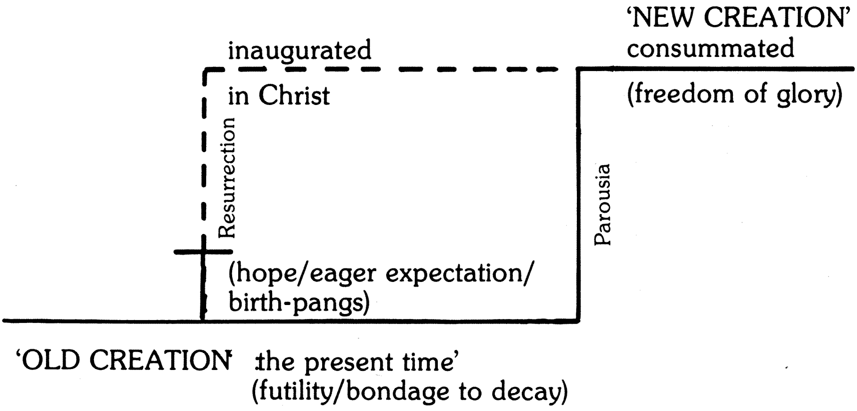
Many physical processes, for example the mixing of hot and cold water, are irreversible apart from the expenditure of external work because they involve an overall increase in microscopic disorder. But despite this entropic factor, supplies of both hot and cold water may be produced readily (from eg lukewarm water) because of the abundant energy resources of earth (eg radiant solar energy) available to drive heaters and refrigerators. Another illustration of reversibility occurs in the hydrological cycle. Thus the potential energy of water flowing downhill 'decays' in the process, nevertheless solar-powered evaporation of water from the oceans, together with rainfall on the uplands completes the cycle. First of all, therefore entropy as such is not necessarily a factor leading inexorably to the 'decay' of life upon earth. but secondly, the entropy of physical systems is a factor essential to our earthly human life. If, for example, there had been no entropy prior to the fall then the oxygen/nitrogen air mixture of Eden could have spontaneously demixed to form zones of either pure oxygen or pure nitrogen. If Adam had walked into a zone of pure nitrogen he would have suffocated from oxygen starvation!

Thus it does not follow that distinctively biological phenomena such as death are generally reducible solely to the effect of subtle physical factors. The 'bondage to decay' is best viewed at the biological level in terms of organic death.

Hope for deliverance

Despite decay and death, however, creation's catastrophe is not final. The living God has not abandoned the natural world without hope. Eagerly the lower creation anticipates liberation. This deliverance is bound up with 'the revelation of the sons of God' (v.19). Christians already become sons of God in this life (v.16), but our sonship is veiled except to faith. As v.23 also states, there is a final and complete manifestation of our adoption to come. This is identified with the resurrection of our bodies at the *Parousia* of Christ. Then we shall be set free from the 'decay' to which we, like the lower creation, have been subjected. The cosmic drama of redemption has, nevertheless, already begun with the resurrection of Christ.[49] And the consummation is approaching (*Romans* 13: 11f). Already Christians have the first-fruits (*aparchē*) of the Spirit as guarantee of the final inheritance. Pauline teaching emphasises both the inaugurated and the future aspects of eschatology; the 'already' and the 'not yet'. Following Geerhardus Vos,[50] the present 'overlap of the two ages' may be represented diagrammatically (figure 3).

Figure 3
THE STRUCTURE OF PAULINE ESCHATOLOGY



The universe therefore waits, not passively nor resignedly, but in eager expectation; impatiently straining for the fulfilment of hope. And this hope is of appropriate participation in the freedom of the glory of God's children. Just as the earlier states of creation were determined through solidarity with Adam in his standing before God, so nature's renewed state will be determined by the glorified state of the new humanity in Christ (v.21, 29).

The hopeful outlook of creation is summarised by Paul in v.22. It is introduced as a matter of common knowledge among his Christian audience. "The whole creation has been groaning together as in the pains of childbirth . . .".[51] These groans are not death-pangs but birth-pangs. On the one hand this underlines creation's severe distress, but on the other the certainty of a happy and worthwhile deliverance to come. The sense of the 'syn' prefix in the two compound verbs must be 'together' or 'with one accord' in view of the emphasis on the *whole* creation. The time indicator: *achri tou nun*: 'right up to the present time'[52] shows that the birth of the new order has not yet taken place. It is also a token that the birth-pangs have not ceased and that hope has not been quenched.

Lessons for today

A major premise of Paul's argument, in the passage we have been studying, is the authority of the book of *Genesis* in its teaching about origins. Paul's apostolic confidence in God's Word should be normative for every Christian today. Already we have noted some implications for the scientific study of origins. Here we must summarise additional implications of this passage for the Christian world-view.

At a superficial glance the Pauline and biblical view of nature may seem pessimistic. Certainly creation is held fast in a state of corruption. And try as it may it cannot free itself. Although the Bible speaks of differentiation and development in world history, a general upward trend is excluded. Thus evolutionary theories are disallowed, both as a basis for future hope and as explanation of nature's present condition.

Nevertheless the biblical outlook is both realistic and full of hope. Firstly, corruption in nature and human sinfulness are basically *unnatural*. Biblical thought refuses to find an intrinsic and thus permanent place for these evils in the scheme of creation.[53] This being so, the deliverance of man and nature from their plight may be envisaged. Consequently, hope is seen to be firmly grounded in God alone. He will not leave his handiwork permanently in this state but will bring judgement and deliverance. The cosmic scope of God's salvation is seen in the earthly ministry of Jesus Christ. His nature miracles, such as the calming of the storm and the instantaneous healing of organic disease and malformation, demonstrate the inauguration of God's kingdom and foreshadow its ultimate fulness. The Christian's certain hope is of a *permanent* future state and cosmic environment from which evil shall be eradicated. In the words of John Murray: "When we think of glorification, then, it is no narrow perspective that we entertain. It is a renewed cosmos, new heavens and new earth, that we must think of as the context of the believer's glory, a cosmos delivered from all the consequences of sin, in which there will be no more curse but in which righteousness will have complete possession and undisturbed habitation."[54]

An important corollary of Paul's argument in *Romans* 8 is the *continuity* of the creation in its three-fold state. Standing in solidarity with mankind, it is this same world, originally created in perfection, now in bondage to decay, which shall be transformed to participate in the glory of the new creation.

Finally, what sort of attitude are we to adopt now to the resources of earth—and to the 'environment' generally? Frequently Christians uncritically support either one or another of two opposing positions. Some adopt the secular values of industrialist society. Others avow the approach of romantic environmentalism. Yet both of these positions are essentially humanistic. As Wilkes contends, a Christian approach to the environment and the energy crisis must be far more critical of these two sides. A Christian approach "allows us to be neither naively optimistic of human scientific progress, nor condemning of it as radically unfruitful. We will avoid the idea that Eden can be planted in the world without turning to impale ourselves on the flaming sword in a doomed attempt to re-enter Eden. We will accept the cursed and temporary status of our earth and work within these limitations".[55] These limitations, nevertheless, do allow us scope to work towards *substantial healing*[56] in our relationships with nature. In the Christian salvation, hope is born. And hope brings purpose and meaning to every detail of our lives.

NOTES

1. A recent survey is provided by G.S. Hendry in *Theology of Nature* (Philadelphia: Westminster Press. 1980).
   Francis A. Schaeffer considers pantheist, platonic and humanist alternatives to the biblical position in *Pollution and the Death of Man: The Christian View of Ecology.* (Hodder and Stoughton, 1970).
2. Recent full scale commentaries on *Romans* by C.E.B. Cranfield, E. Käsemann and J. Murray exegete this passage in some detail. For bibliography of periodical articles see Cranfield p.40 and Käsemann p.230 and also the paper by Gunther Kehnscherper *Romans 8:19—On Pauline Belief and Creation* in *Journal for the Study of the NT*, supplement series 3, Sheffield 1980 p.233-243.

3: *Theology of the NT* I p.174.

4. See R.C. Roberts. *Rudolf Bultmann's Theology: A Critical Interpretation* (London: SPCK 1977), and Anthony C. Thistleton: *The Two Horizons* (Exeter: Paternoster Press, 1980) p.205-292.
5. H. Wenz, Die Ankunft unseres Hern am Ende der Welt. (*Arbeiten zur Theologie* I 21) 1965 p.48ff. See also Käsemann *op.cit.* and Kehnscherper.
6. E. Yamauchi, *Pre-Christian Gnosticism.* (London: Tyndale Press, 1973)
7. For example in *4 Ezra* 7:11 ff and *2 Apocalypse of Baruch* 15: 7f.
8. *Isaiah* 11: 6-9; 35; 55: 12 f; 65: 17; 66:22; etc.
9. See for example, D.A. Carson: *Adam in the Epistles of Paul. In the beginning . . .* (ed. N.M. de S. Cameron, Glasgow: BCS, 1980) p. 28-43.
10. M.D. Hooker, *NT Studies 6* (1959-60) p. 297-306 and *13* (1966-67) p. 181-3; A.J.M. Wedderburn, *Studia Biblica* 1978, III, p.413-430; J.D.G. Dunn, *Christology in the Making*, (London, SCM 1980) p. 101-5.
11. J.G. Gibbs, *Creation and Redemption,* (Leiden: E.J. Brill, 1971) p.33-47.

12. H. Ridderbos, *Paul.* (Grand Rapids: Eerdmans, 1975) p.214-233.
13. See the discussion below, under 'Hope of deliverance'.
14. e.g. Cranfield, *op.cit.* p.410.
15. cf. Gibbs, *op.cit.* p.37.
16. cf. R.B. Gaffin, Jr. *The Usefulness of the Cross, Westminster Theological Journal 41* (2), 1979 p.228-246, esp. p.236-8.
17. This participation is involved in the application, but not the accomplishment of redemption (see Gaffin p.243f.) Note the emphasis on this theme in *2 Corinthians* 1:5; 4:9ff; 5:2; 6:3-10; 7:5f; 11:16-30, 12:9f; 13:3f.
18. H.H. Esser, Creation, NIDNTT I p.378-387. W Foerster, TDNT III p.1000-1035.
19. *apo ktiseōs kosmou: 'since* the creation of the world'
20. *pasa hē ktisis.*
21. See Cranfield, *op.cit.* p.411 for a survey, (with reference to the dissertation by H. Gieraths), Also Gibbs p.40.
22. A. Schlatter, *Gottes Gerechtigkeit* (Stuttgart, 1935). p. 269-274.
    Käsemann, *op.cit.* p.233.
23. *Ps.* 65:12f; *Is.* 24:4, 7; 49:13; 55:12. *Jer.* 4:28; 12:4 etc.
24. Note the enumeration of cosmic powers in v. 38f.
25. F.R. Tennant, *The Sources of the Doctrines of the Fall and Original Sin* (Cambridge: University Press, 1903) p.281.
26. Paul's survey of cosmic history, (tabulated in figure 1) involves complementary perspectives of liberation, birth, etc.
27. The 'hope of glory' appears earlier in *Romans* 5:2, and is developed more fully in v.18 & v.30 of ch. 8.
28. Note for example the sentiments of *Ps* 104:24, and cf. E.E. Ellis, *Paul's use of the OT.* (Edinburgh: Oliver and Boyd 1957).
29. *ouch hekousa* 'not willing (ly)' ie. 'not through its own fault' (v.20)
30. *dia ton hupotaxanta* (v.20). *Hupotaxanta* is the aorist active participle (masculine singular accustive) of *hupotassō*, the present passive indicative of which occurs in v.7.
31. *Hupetagē* is the aorist passive indicative (3rd person singular) of *hupotassō*.
32. The emphatic *alla* underlines the decisiveness of the subjugation.
33. The words *eph' elpidi* 'in hope' are more naturally connected with *hupetagē* than with *hupotaxanta.* The creation was not subjected to frustration without any hope. The connecting particle *hoti* introduces the content of that hope.
34. The propriety of an historical interpretation may also be vindicated by an investigation of Genesis 1-3 in its own terms. See E.J. Young, *In the Beginning.* (Edinburgh: Banner of Truth, 1976), and J.G. McConville: *Interpreting Genesis 1-11 (In the Beginning...* op.cit.) p.5-17.
35. *tē(i) mataiotēti hē ktisis hupetagē.*
36. Note also the parallelism between 'futility' and 'decay' in figure 1.
37. W.F. Arndt and F.W. Gingrich, *Lexicon* p.496.
38. Translating for *heḇel*
39. Arndt p.497.
40. *op.cit.* p.413.
41. A speculative link has been suggested between the term *mataiotēs* and the cosmic powers of evil, since the adjective *mataios* is used in the LXX with reference to the pagan gods. This appears to be an over-subtle line of thought but cf. Ridderbos, *op.cit.* p.91ff, and *Romans* 8:38f.

42. *Matthew 6*: 26, 28-30; etc. cf. J. Murray *Common Grace* in Collected Writings II (Edinburgh: Banner of Truth, 1977) p.93-119.
43. ie. 'decay' is in apposition to 'bondage'.
44. *Doxa* should also be interpreted as in apposition to 'freedom' ie. 'the freedom which consists in glory.'
45. This modal analysis is similar to that of Vern S. Poythress: *Philosophy, Science and the Sovereignty of God.* (PRPC, 1976) p.30, etc.
46. See F. Merkel NIDNTT I p.467ff and G. Harder TDNT IX p.102-5 for discussion of the word group. The adjective *phthartos* occurs in *Romans* 1:23.
47. *cf. Is.* 11:6-9, and N.M.de S. Cameron, *Evil and Evolution,* in *Focus on Creation* Derby: Rainbow Press, 1978 p.23-28
48. H.M. Morris and J.C. Whitcomb: *The Genesis Flood* (Philadelphia; PRPC 1961) p.224f.
49. R.B. Gaffin, Jr. *The Centrality of the Resurrection* (Grand Rapids: Baker, 1978).
50. Geerhardus Vos. *The Pauline Eschatology* (Grand Rapids, Eerdmans 1961) p.38.
51. Present tense: *sustenazei kai sunōdinei.* Reference to the Messianic birth-pangs occurs in *Mark* 13:8. Compare the Qumran document 1QH 3:7ff.
52. A comparable time-indicator occurs in v.18. however, *tou nun kairou* denotes the period from the resurrection to the *parousia.*
53. For a critique of the harmonistic theodicy of G.W. Leibniz see G.C. Berkouwer, *The Providence of God* (Grand Rapids; Eerdmans 1952), p.236 ff, and H.M. Morris and J.C. Whitcomb, *op.cit.* p.468 ff.
54. John Murray, *Redemption Accomplished and Applied* (London, Banner of Truth , 1961) p. 179.
55. Peter Wilkes, *No Return to Eden: The Debate over Nuclear Power. Christianity Today,* April 4th 1980 p. 442-445.
56. F.A. Schaeffer, ref 1, p.47ff. cf. J.F. McConville, *Birds Nests and Fruit Trees, Third Way 4* (18), July/August 1981 p.12-13.

HAEMOGLOBIN AND THE CHEMISTRY OF BLOOD.

by Terry Hamblin

Blood is an extremely complex tissue, not at all like the tomato ketchup that isues from the vest of the television cowboy. It has an intricate structure and function. The red colour is provided by the red corpuscles, microscopically small biconcave discs, filled with the red protein haemoglobin. In every teaspoonful of blood there are 25 billion red corpuscles. Haemoglobin has a very complicated structure comprising two separate substances,—

I) Haem,—a complex organic compound containing iron.
II) Globin,—a globular protein molecule with four polypeptide chains.

99% of the haemoglobin in Haemoglobin A which consists of two alpha and two beta chains, which fit together to form a roughly spherical molecule. The two types of chain differ slightly from each other, the alpha chain has 141 amino acids and the beta 147. Both have a similar three dimensional structure which is determined by the order of the amino acids that make up the molecule. In each chain is a small niche where the haem molecule fits.

How does the cell know how to make this labyrinthine molecule?

The mother cell of the red cell, known as a normoblast, has a nucleus containing 46 chromosomes. These are formed from tightly coiled chains of deoxyribonucleic acid, (DNA). DNA is a double helix with a structure rather like a spiral staircase. The 'stairs' are made of pairs of 'bases' Guanine-Cytosine, Adenine-Thymidine, Cytosine-Guanine, or Thymidine-Adenine. The order of these bases is the genetic code. This code has now been deciphered and it is known that a triplet of bases codes for a specific amino acid. Since there are 64 ways of selecting a triplet of bases from the four possibles, and only 20 amino acids, it is clear that some amino acids are coded for by a number of different triplets. How this code is translated into haemoglobin production is beyond the scope of this paper. It is enough to know that a messenger, known as RNA takes a set of instructions to the 'factory'—called the ribosome, where the amino acids are assembled into protein chains.

The study of the chemistry of blood enables us to ask questions about three particular areas that are of relevance to the creation/evolution debate. These areas are Taxonomy, Mutation and Design.

TAXONOMY.

The classification of plants and animals into species, families and orders has long been held to be evidence of a common descent. Gross resemblences however are often grossly misleading. Some people, for instance, have oval red cells rather than round ones. The only other mammals with oval cells are camels. It is clearly ludicrous to suggest that some men descend from monkeys and others from camels!

Because of this, evolutionists have looked at fine details to confirm their beliefs. The first attempt to see resemblances between the blood of animals was made by G.H.F. Nuttall in 1904. His experiments were done before anything was known about the structure of proteins or their electrophoretic separation. The body's immune system is known to be able to differentiate between different diseases. An attack of measles protects against further attacks, but not against mumps. Nuttall used this specificity of the immune response to look for resemblances between proteins. He injected the blood of an animal into a rabbit and the rabbit made an antibody against it. He then tried to react the antibody with the blood of different animals. If they also reacted, he surmised that they were related to the original animal. However, we now know that his experiments were unbelievably crude and his conclusions worthless, suggesting such taxonomical nonsenses as pheasants being more like men than they are like pigeons.

This sort of work has been repeated recently using highly purified reagents. A report in Nature in 1979 purported to show from such experiments that the Formosan Macaque is more closely related to man than the great apes are, and that the South American Owl monkey is closely related to the African apes, rather than to other South American monkeys. Although these experiments often suggest relationships that agree with accepted taxonomic dogma, frequently they conflict with these. Evolutionary opinion turns a blind eye to results which do not fit the case. Comparisons of amino acid sequences are even more specific in delineating resemblances between proteins than immunological comparisons. The beta chain of haemoglobin in man differs from that of the gorilla in only two positions, and this is quoted as strong evidence of a genetic relationship between the two.

A similar protein to haemoglobin is known as Cytochrome c. The exact structure of this molecule has been determined for at least 38 different species. There is a tendency for similar animals to have similar structures, but there are also gross discrepancies. For example, the rattlesnake's Cytochrome c more clearly resembles that of man in that it does that of the turtle,—another reptile. Man is apparently closer to a pigeon than a dog, yet closer still to a rabbit. At position 81, the rattle snake has valine, an arrangement otherwise only found in moths and flowers! An investiagation reported in Nature in 1978, which looked at 23 blood proteins, including haemoglobin, suggested on the whole closer retationships between man and the great apes, than between man and the lesser apes. But they were less closely related than say hamsters and mice. In addition, a fuller report looking at twice as many proteins found twice as large a genetic difference.

What should we make of these reports?

First, we should remember that structural identity does not necessarily imply genetic identity. A given amino acid may be coded for by as many as six different DNA triplets. Secondly, a clear genetic relationship has not been established between different species either by resemblances in molecular structure or in immunological reactions. Thirdly, we must accept that despite hilarious anomalies, there are often similar structures of the proteins of taxonomically related species. But this is just what we should expect. For proteins, function is closely related to structure, so that all we really have is the old classification arguement writ small. Similarity of structure does not imply evolutionary descent, it could equally mean a single designer. The similarities between the Volkswagen Polo, and the Ford Fiesta and the Fiat 127 do not mean that they were derived from each other. The designers were given the same problem to solve, and came up with similar answers.

MUTATION.

Whereas the evolutionist needs many beneficial mutations to fuel progress, it has become axiomatic for the Creationists that mutations are almost always harmful, or at best, neutral. This view has been challenged by citing mutations of the haemoglobin molecule as being beneficial in conferring protection against malaria.

What are the Facts?

There are several types of mutant blood disorders which are commoner in areas where malaria is endemic. The argument runs that these conditions are so severe that by now they should be rare because of natural selection unless they conferred some selective advantage. It is proposed that this advantage is resistance to malaria.

The best known of such examples is sickle cell disease. In this condition the sixth amino acid of the beta chain of haemoglobin which is normally glutamic acid is substituted because of a mutation by valine. This so disrupts the function of the molecule that it precipitates in conditions where oxygen is short, causing distortion of the disc shaped red cell into a sickle shape. Such red cells do not travel properly in blood vessels so that various tissues and organs become starved of blood and die. It is a painful disease, and usually fatal before the twentieth birthday. The disease only occurs if inherited from both parents. If only one parent passes on the disease it is known as sickle cell trait and is pretty harmless and compatible with a normal life span. It has been proposed that this carrier state confers resistance to malignant malaria. There is now clear experimental evidence that this is in fact so. Malarial parasites within red cells containing both haemoglobin 'A' and haemoglobin 'S' are more easily killed.

There are two other genetic diseases which are relatively harmless in the carrier state which may persist because they confer resistance to malaria. Thalassaemia, in which one of the chains of haemoglobin is produced more slowly than normal, and glucose 6-phosphate dehydrogenase deficiency which produces anaemia when affected patients are exposed to broad beans. In both of these conditions the only evidence linking them with malaria is circumstantial. What can be said about these mutations is that they are all harmful, but that they may confer protection from a disease that is even more harmful.

There is, however, a more difficult mutation to deal with. The purpose of blood group antigens is not really known. That is not to say that they do not have a purpose and we do know that certain diseases are commoner in Group 'A' rather than Group 'O'—cancer of the stomach is a good example, and there are some diseases which virtually only occur if a certain white cell blood group is present; for example, ankylosing spondilitis with HLA-27. The Duffy antigenic group is one of the red cell groups for which we have no real knowledge of its function or purpose. It happens however, that this antigen is the receptor by which the malarial parasite plasmodium vivax gains entry into the red cell. In West Africa a mutation has deprived the endogenous population of its Duffy antigen and there is no vivax malaria there. The other forms of malaria abound so that all in all the population is no better off. Having no Duffy antigen appears to be harmless, although it would be difficult to establish this for sure, and there are in fact some diseases that are commoner in West African negroes. On the face of it then, this is a neutral mutation, which confers protection from a specific disease.

We should therefore, be careful in stating categorically that all mutations are harmful. Some may actually be of benefit. This does not detract from the fact that to build an evolutionary edifice on a series of hopeful mutations is very implausible.

DESIGN.

For a red cell to function properly and optimally the 147 amino acids in the β chain and the 141 in the α chain must be in the right order and in the right place. The molecule is not inert. It has the function of giving and taking oxygen to and from the tissues. Built into its structure is the knowledge of when to do this. A single amino acid in the wrong place can make it give when it ought to take, or fail to release when it should do, or alter the shape of the red cell, or allow the red cell membrane to be degraded or alter its function in many other ways.

Blood proteins all have these specific and accurate designs that cannot be tampered with. One group of such proteins, the immunoglobulins, has a structure that is varied so that they combine with any foreign protein that the organism could ever meet. The diversity is so great that biochemists have invented a mythical process by which the diversity could be produced. They have to postulate a Generator of Diversity,—G.O.D. for short.

As I said previously, the information for these designs is contained in the chromosomes in the genetic code of bases G T C G etc., These are read in threes and clearly they must be read starting from the right base, a message read from the second rather than the first base would produce a protein totally different at each point. There is in fact a haemoglobin type where this happens half way along the molecule. It is called Haemoglobin Wayne and it does not work. Such a mistake is called a frame shift.

There is a sort of virus known as ØX 174. It lives with the bacteria that live in the human bowel. Scientists who have unravelled its DNA have found that there is not enough information to produce the proteins in its membrane. It now appears that sufficient information is found by the use of a frame shift.

The gene is first read off from the first base in order to produce Protein 'A'. Then the same message is read missing out the first base and starting at the second. This translates as Protein 'B' which fits together with Protein 'A' forming the membrane of the virus. This is design of a very high degree. Try writing a message that has another message contained within it, with the gaps between the words one letter later than the original, and make the messages comprehensible and complementary. Such a state of affairs is so unlikely to have occured by chance that some Janpanese scientists have suggested that ØX 174 is a message from outer space, placed handily within our bowels waiting until we have a good enough technology to interpret it. What some people will turn to rather than believe in God!

CONCLUSION.

1) Do not over-sell your case. In general, animals that look alike do have similar protein structures. It is an example of conservation in design,—not evolution.

2) Natural selection and artificial selections do occur, and may select out mutants with limited advantages,—but this is not evolution.

3) The design of this material is delicate and exquisite and not to be tampered with.

The more one learns of our Creator, the more we are in awe.

BOOK REVIEW

Redating the Exodus and Conquest John J. Bimson Almond Press
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Is there any archaeological evidence of Israel's slavery in Egypt, their deliverance at the time of the Exodus, and their conquest of Canaan some forty years later? Most archaeologists and Old Testament scholars, including many British scholars of the conservative persuasion believe that the Exodus and Conquest occurred in the latter half of the 13th century B.C. A minority, consisting particularly of conservative scholars in the Americas, dissent from this view, since they feel that it is contradicted by the Bible's own date for the Exodus (1. Kings 6.1) which places this event roughly in the middle of the 15th century B.C.

John Bimson's *Redating the Exodus and Conquest*, an abbreviated version of his doctoral thesis submitted to the University of Sheffield, attacks the 13th century B.C. hypothesis and adduces evidence in support of the 15th century placement. Let me summarise some of his conclusions in brief:

Bimson rejects the view that Pithom and Rameses, the stone cities built by Israelite slave labour (Exodus 1.11) are to be identified with the sites of Tell el-Maskhouta and Tanis respectively and were therefore constructed during the reign of Rameses II (13th century). Instead he proposes the sites of Tell er-Retebah (or possibly Heliopolis) and Qantir, which have both produced evidence of middle kingdom building projects. Since the middle kingdom ended in the early 18th century B.C., if these constructions are to be identified with those produced by the Israelite slaves during their 430 year residence in Egypt (Exodus 12.40), then the Israelites must have experienced their first oppression fairly soon after their arrival in Egypt.

Bimson places the Exodus at about 1470 B.C. during the beginning of the reign of Tuthmosis II. Since this Pharaoh is known to have built in the delta region it squares with the Biblical evidence.

Bimson points out the serious archaeological problems that a 13th century placement of the conquest would produce. He points out that many of the major sites, including Jericho and Ai have produced no archaeological evidence. Instead, he proposes that the wide spread destruction of many Palestinian cities associated with the end of the Middle Bronze Age (traditionally associated with the Egyptian war of retaliation against the Hyksos and dated to the sixteenth century) should be redated to the 15th century and be identified as the visible remains of Joshua's lightning conquest. Thus he proposes that the imposing defensive walls and artificial embankment of

Middle Bronze Age Jericho were those that fell before Joshua's armies. Furthermore the Middle Bronze Age city was destroyed by fire, which is in accordance with the Biblical evidence (Joshua 6.24) that Joshua burned the city with fire.

He also produces evidence that the sites of Bethel and Ai are not to be identified as Beitin and Khirbet et-Tell respectively, but as Bireh and an as yet unidentified site in its vicinity.

Concerning Hazor Bimson points out that the traditionally accepted views do not allow for a resurgence of Hazor under Jabin (Judges 4-5). He proposes that the destruction level traditionally associated with the conquest of Joshua be reassigned as the destruction level following the defeat of Jabin by Deborah and Barak, and proposes that the destruction level at the end of the Middle Bronze Age be interpreted as evidence of the conquest of Joshua.

Bimson is to be commended for providing a hypothesis which allows the Biblical evidence to interpret the archaeological evidence and not *vice versa*. However, in a few small points he shows a reluctance to accept the data provided by scripture at its face value. He concurs with Wenham in suggesting a figure of 72,000 for the total number of Israelite excapees from Egypt. Compare the Bible's own figure of 600,000 men plus women and children (Exodus 12.37). He considers the genealogies of the High Priests in 1 Chronicles 6 1-15 as "an artificial construction with little relation to historical fact". He considers the pre-Iron age (before 1200 BC) references to iron such as Genesis 4.22 and Psalm 105.18 to be anachronistic and thereby fails to appreciate the widely accepted view that there was a limited use of iron before the start of the so-called Iron age. Finally his placement of the Exodus in the *early* years of the reign of Tuthmosis III would seem to show that he ignores, what the Bible implies to be the fate of the Pharaoh of the Exodus, namely that he drowned in the Red Sea. (Exodus 14.10, 23, 28)

Bimson's work pre-supposes a knowledge of archaeological terminology and the generally accepted sequence for Palestinian sites. His fifth chapter on bichrome ware will probably have little interest to the general reader, nevertheless the work is to be recommended as a closely argued alternative to the conventional interpretations of the Biblical evidence.

Paul Lawrence

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